Remarks

In view of the above amendments and the following remarks, reconsideration and further examination are respectfully requested.

Status of All of the Claims

Below is the status of the claims in this application.

1. Claim(s) pending: 1-26, 31-35.
2. Claim(s) canceled: 27-30.

Claim Rejections

Rejections Under §101

Independent Claim 27

Claims 27 – 30 were rejected under 35 U.S.C. 101. In order to obviate these rejections and expedite prosecution, Applicants have cancelled claims 27-30.

Rejections Under §102

Overview of Hutson

As Hutson is cited as the predominant reference in all of the outstanding rejections, a brief overview of the methods taught in Hutson is appropriate. Hutson is directed to the processing, enhancement, and display of acoustic data taken at varying angles and frequencies over time. For these purposes, the data is represented in matrix form ("The BTR representation of bearing, amplitude and time allows the acoustic data to be represented by a matrix." col. 5, lines 41-43). In particular, Hutson teaches the construction of a three-dimensional matrix using the data obtained. The three-dimensional matrix represents acoustic energy detected by time, frequency, bearing. This three-dimensional matrix is then reformatted into a two-dimensional matrix by "separating the three-dimensional matrix into a number of two-dimensional matrices and then concatenating the two-dimensional matrices along a common dimension" (col.8, lines 21-23). The resulting two-dimensional matrix is then decomposed into singular vectors and singular values. These singular vectors and singular values, which may be selectively weighted

based upon their classification as loud sources or noises, are then used "as a filter to enhance and/or suppress features within the BTR matrix data." (col. 6, lines 29-30) The filtering is accomplished via matrix multiplication, the result of which is an enhanced two-dimensional matrix (col. 6, lines 27-40, FIGS. 7A, 7B). This enhanced two-dimensional matrix is then partitioned in a reverse fashion so as to reconstruct the original three-dimensional matrix. The three-dimensional matrix is then displayed in a transparent cube, which may be rotated by the user.

Anticipation Under §102

Independent claims 1, 21 and 34 stand rejected as anticipated by Hutson. These rejections are traversed. It is well settled law that a "claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Furthermore, "[t]he identical invention must be shown in as complete detail as is contained in the ... claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). See, Manual of Patent Examining Procedure (MPEP) §2131. It is not sufficient that the prior art reference disclose all of the elements in isolation. Rather, "[a]nticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim." Lindemann Maschinefabrik GmbH v. American Hoist & Derrick Co., 730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984, emphasis added). The Examiner has the burden of presenting a prima facie case of anticipation. In re King, 801 F.2d 1324, 1327, 231 USPQ 136, 138-39 (Fed. Cir. 1986); In re Skinner, 2 USPQ2d 1788, 1788-89 (B.P.A.I. 1986).

Independent Claims 1 and 34

In the anticipation rejection of independent claim 1, the Action asserts that Hutson describes a system for processing a stream of vectors, generating a visualization from the stream of vectors, determining a set of values corresponding to one or more eigenvectors of a matrix comprised of a group of the vectors, and projecting another group of the vectors onto the visualization as a function of the set of values. Specifically, the Action asserts that the BTR representation of bearing, amplitude, and time of Hutson, shown by image 70 of FIG. 6, is the

visualization generated from a first group of vectors as required by the claim. Additionally, the Action asserts that the singular value decomposition of these same vectors provides the values corresponding to one or more eigenvectors as further required by the claim.

In traversal, Applicants contend that Hutson does not properly teach the projection of data vectors onto a visualization as recited in claim 1. Applicants acknowledge that Hutson teaches a process wherein singular vectors are calculated and data is eventually displayed. However, Hutson does not properly show the relationship between the singular vectors and the display recited in claim 1, specifically that members of "a second group" of data vectors are "projected onto" the visualization as a function of the singular vectors. As explained in Applicants' disclosure, the method of claim 1 provides an efficient mechanism for "updating" or "supplementing" a visualization when new data arrives.

The Action has not identified what vectors correspond to the "second group of data vectors" required in claim 1 nor has the Action pointed to any teaching in Hutson of how such vectors are "projected onto" a visualization as a function of singular values. The visualization identified by the Action is the BTR image 70 of FIG. 6. However, the singular vectors of Hutson, which are cited as corresponding to the "set of values" of claim 1, are not utilized to project any particular vector onto the BTR representation 70 of FIG. 6. Rather, the section of Hutson cited in the Action (col. 6, lines 41-50) describes the utilization of singular vectors for purposes of data compression, noise removal, and desired data enhancement, which are various forms of data processing that occur *prior to* visualization (see col. 7 line 64 – col. 8 line 3). The cited section of Hutson does not seem to specify any particular method of creating the display and lacks any description of how, if at all, the singular values would be involved in creating or supplementing the display.

With respect to dependent claim 5, the Action has also failed to identify in Hutson any action performed in response to a change in the data receipt rate. Claim 5 specifically requires that the projecting be performed "in response to an increase in the rate of receipt of the stream of data vectors." In rejection, the Action cites to a section of Hutson (col. 15, lines 36-48) which is directed to an alternate embodiment of the disclosure. More specifically, the display of the processed data in Hutson is described as having three sections, a top 270, middle 272 and bottom 274. The top section of the data display is updated at a fast rate (every 6 seconds), the middle at a slower rate (every 10 seconds) and the bottom at a still slower rate (every 40 seconds).

However, nowhere in the cited section of Hutson, or elsewhere, is an increase in the rate of receipt of the acoustic data, or data vectors for that matter, discussed. Rather the cited section of Hutson describes a fixed periodic data refresh rate having to do with the frequency of updating a visualization. Still further, nowhere in the cited section is the step of projecting each vector within a second group onto a visualization as a result of a perceived increase in the number of data vectors. As such, the Applicants again respectfully request that the rejection with respect to claim 5 be withdrawn.

On page 5, the Action asserts that "claim 34 is similar in scope to claim 21", but it is believed that the Action intended to relate claim 34 to claim 1 (not claim 21). Hutson fails to anticipate claim 34 for reasons discussed above regarding the impropriety of the rejection of claim 1.

Independent Claim 21

Hutson does not teach the execution of a multi-dimensional scaling routine on a set of data vectors as recited in claim 21. The Action asserts that Hutson describes "visualizing at least a portion of the data stream by executing a multidimensional scaling routine with at least a corresponding portion of the data vectors." In support of this assertion, the Action cites to FIG. 6 of Hutson. FIG. 6 of Hutson, according to its description, shows a BTR image, which is a graphical representation of the amplitude of the acoustic data detected (represented numerically from 0 to 15) according to bearing and time. A multidimensional scaling routine (MDS), such as that required to be performed on the data stream by claim 21, is known in the art to be a method for exploring similarities or dissimilarities in data. A common occurrence of the MDS algorithm begins with a matrix of item-item similarities and then assigns a location of each item in a low-dimensional space, suitable for graphing or visualization. For example, MDS may be used to create visualization by reducing a high-dimensional matrix into fewer dimensions. The mere visualization of acoustic data, such as the cited BTR image in a graphical form, does not rise to the level of "executing a multidimensional scaling routine" as required in order to properly anticipate the claim.

Additionally, vector sampling or vector dimension reduction (including wavelet decomposition) is also required in claim 21 in order to provide various computational efficiencies. The cited sections of Hutson describe singular value decomposition as a method for

compression and do not describe wavelet decomposition as required by vector dimension reduction or the process of selecting a subset of the data stream for evaluation and processing as is provided by vector sampling. Rather, the remaining sections of Hutson describe the conversion of a three-dimensional matrix into a two-dimensional matrix and vice versa. However, these processes only reduce the dimension of the three-dimensional matrix; they do not actually reduce the dimensions of the vectors contained therein. As such, for at least the reasons cited above, the rejection of claim 21 should be withdrawn.

With respect to dependent claim 26, Hutson fails to show updating the projection with one or more data vectors as required in order to anticipate claim 26. The sections of Hutson cited in the Action (col. 6, lines 41-50) are directed to the utilization of singular vectors for purposes of data compression, noise removal, and desired data enhancement, wherein the data may subsequently be visualized (see col. 7 l. 64 – col. 8 l. 3). Hutson does not specify how the BTR representation 70 of FIG. 6 would be updated with subsequently received data, and Hutson fails to teach that such updating occurs as a function of the singular vectors

Rejections Under §103

Independent Claim 8

Claim 8 stands rejected under 35 U.S.C. 103(a) as being obvious over Hutson in view of Schkilnik (US 2003/0152069) and Aggarwal et al. (US 6,505,207). As acknowledged in the Action, Hutson does not disclose receiving a second portion of the data stream above a defined rate. The Applicants submit that the Action has also failed to establish a combination that properly disclose or suggests all of the features as recited in independent claim 8.

Schkilnik discloses a digital data concentrator which receives a plurality of digital data streams and combines them into at least one higher speed digital data stream. While it may be that one of skill in the art would be aware of the techniques of Schkilnik for combining digital data streams, the distinction clearly remains that claim 8 requires a first visualization, generated from data vectors in a stream, and the generation of a second visualization which is generated by updating the first visualization with the data vectors received from the same data stream at the elevated data rate. It is a requirement of claim 8 to have an increase in the rate at which the vectors, or data, are arriving and to subsequently perform an alternative visualization technique

based upon the previously received data. Therefore, even if the data stream concentrator of Schkilnik were arranged to provide the acoustic data stream of Hutson at an increased data rate as asserted, the combination would still lack a second visualization which is an update of a first visualization. For example, Hutson does not appear to describe or suggest monitoring the data rate of the acoustic data stream, recognizing an increase, and generating a second visualization based upon the data received above the defined rate.

Moreover, the data rate in Hutson is determined by the frequency of sampling, the number of phones (acoustic detectors), and the number of angles selected. Once established, those system parameters would not likely be changed, and as a result Hutson's incoming data stream would essentially be at a fixed rate. Accordingly, there would seem to be no reason to modify Hutson so as to be able to accommodate a variable incoming data rate.

Moreover, even if it were obvious to modify Hutson to accommodate a variable incoming data rate, the Action has failed to establish that it would have been obvious to partition the data based on a rate of receipt and to act on the partitioned data in the manner recited in claim 8. The Action appears to acknowledge that neither Hutson nor Schkilnik disclose generating a second visualization by updating a first visualization with one or more additional vectors corresponding to data received above the defined rate. The reliance on Aggarwal is similarly misplaced. Aggarwal describes a method of identifying which feature variables, or eigenvectors, most clearly distinguish a fixed, and not continuously received, data set. Accordingly, Aggarwal cannot properly teach or suggest partitioning data based on a data receipt rate and generating first and second visualizations based thereon.

In order "[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." MPEP 2143.03 (citing, In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Furthermore, the prior art must be taken only for what it would teach or suggest to a person of ordinary skill in the art at the time of the invention, without using impermissible hindsight. Moreover, "[a] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007). Without the benefit of hindsight gained from viewing the present application, one of ordinary skill in the art at the time of the invention would not have modified the cited references as asserted in the Office Action to arrive at the invention as recited in the present claim 8.

For these and other reasons, Applicants respectfully submits that independent claim 8 along with its respective dependent claims are allowable over the references of record and request that the rejection of these claims under 35 U.S.C. § 103 be withdrawn.

Independent Claims 16 and 35

Claim 16 was rejected under 35 U.S.C. 103(a) as being obvious over Hutson in view of Chakrabarti (US 2003/0152069). In traversal, the Applicant submits that a *prima facie* case of obviousness has not been established because no proper reason to modify the Hutson in the manner that has been asserted has been established. Applicant submits that, when properly considered, the only suggestion of the presently claimed invention is provided by the present application.

Both of the cited references fail to explicitly or implicitly provide any teaching, suggest or motivation to arrive at the invention recited in claim 16. As stated above, Hutson describes a system for data compression and enhancement utilizing singular value decomposition and modification of the resulting values in order to enhance the acoustic data by removing loud sounds and noises. The recitation by the Examiner that "Haar wavelet decomposition is simple and very fast to compute" does not establish a reason for replacing the singular value decomposition of Hutson, which is done so that the resulting values may be modified in order to enhance the data by removing noise and loud sounds, with wavelet decomposition. It is not clear that such a substitution would be compatible with Hutson's purpose, for nowhere in Hutson is vector dimension reduction described. Rather Hutson utilizes decomposition for purposes of feature enhancement. It appears that the Examiner merely utilizes the current disclosure, as viewed using impermissible hindsight, in order to select elements from the prior art, which may well be incompatible, in order to arrive at the claimed invention.

For this and other reasons, the Applicant respectfully submits that independent claim 16 along with its respective dependent claims, and similarly rejected claim 35, are allowable over the references of record and request that the rejection of these claims under 35 U.S.C. § 103 be withdrawn.

Independent Claims 31

Independent claim 31 was also rejected under 35 U.S.C. 103(a) as being obvious over Hutson (US 5,175,710) in view of Aggarwal (US 6,505,207). In response, the Applicants submit that the Action has failed to disclose or suggest all of the features as recited in independent claim 31. As described above with respect to the rejection of claim 8, the disclosure of Aggarwal describes a method of identifying which feature variables, or eigenvectors, most clearly distinguish a fixed, and not continuously received, data set. The fixed data set is then able to be represented in a reduced form as a combination of the eigenvectors. Thus, each data vector has its dot product calculated with an eigenvector that was calculated based upon it. In contrast, claim 31 requires the generation of a visualization and the computation of an eigenspace (collection of eigenvectors) for a first group of vectors and then updating the existing visualization with one or more additional vectors based upon the pre-existing eigenspace. Therefore, the calculation required by claim 31 requires that the eigenvector used be computed based upon a set of vectors which excludes the vector in the current calculation. As such, one of skill in the art would not arrive at the claimed invention by incorporating the reduced representation of data into Hutson. Furthermore, due to the static, and not continuous, nature of the data set in Aggarwal, one of skill in the art would not be motivation to combine the representation method into the disclosure of Hutson.

As one example, Hutson does not describe monitoring the data rate of the acoustic data stream, recognizing an increase, and generating a second visualization based upon the data receive thereon. Moreover, the data rate in Hutson is static in that the amount of data received is fixed as determined by the frequency of sampling, the number of phones (acoustic detectors), and the number of angles selected. "If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious." MPEP §2143.01 VI (citing, In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). Therefore, one of skill in the art would not be motivated to modify the disclosure of Hutson in order to accommodate a variable incoming data rate due to the controllable nature of the processed data.

For these and other reasons, Applicants respectfully submit that independent claim 31 along with its respective dependent claims are allowable over the references of record and request that the rejection of these claims under 35 U.S.C. § 103 be withdrawn.

Closing

It should be understood that the above remarks are not intended to provide an exhaustive basis for patentability or concede the basis for the rejections in the Office Action, but are simply provided to overcome the rejections made in the Office Action in the most expedient fashion.

In view of the above amendments and remarks, it is respectfully submitted that the present application is in condition for allowance and an early notice of allowance is earnestly solicited. If after reviewing this amendment the Examiner feels that any issues remain which must be resolved before the application can be passed to issue, the Examiner is invited to contact the undersigned representative by telephone to resolve such issues.

Respectfully submitted,

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